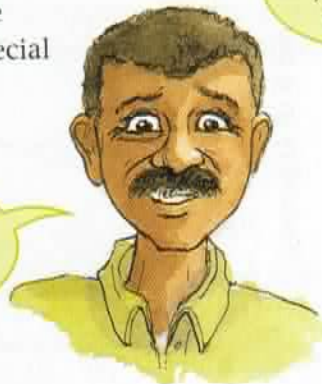


I1 Energy on the move

Talking about energy

In science, we use the word 'energy' in a special way. **Energy** makes things happen.

That boy has lots of energy.



You were very energetic today.



Eat your breakfast. It will give you energy.



I haven't the energy to do that!



On the move

If something is moving, it has energy. We call this **movement energy** or **kinetic energy**. The athlete in the photo is running. He has lots of kinetic energy.



Sounding out

When a jet plane goes very fast, you hear a booming sound. When there is a loud sound, there is a lot of energy. If there is less energy the sound is softer.

If something makes sound, it is giving out energy. We call this **sound energy**.



Lighting up

If something is giving out light, then it is giving out energy. We call this **light energy**. The electric light in the photo is giving out light energy. It is a **light source**. A light source gives out light energy. The most important light source is the Sun.



Hotting up

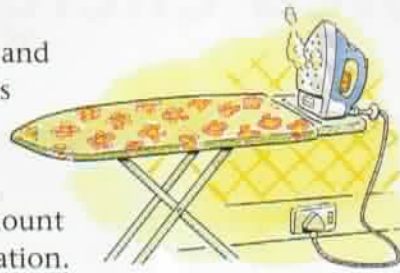
When something is hot, it is giving out energy. The metal in the photo is very hot. It is giving out lots of energy. We call this **thermal energy** or **heat energy**.

- a** How do our bodies detect: (i) light energy?
(ii) sound energy? (iii) thermal (heat) energy?

Plug it in

Look at the picture of the iron. It only works if it is plugged in and turned on. It needs energy from electricity to work. We call this energy **electrical energy**. Electrical energy comes from power stations or from batteries.

Look at the photo of the electricity meter. It measures the amount of electrical energy coming into the house from the power station.

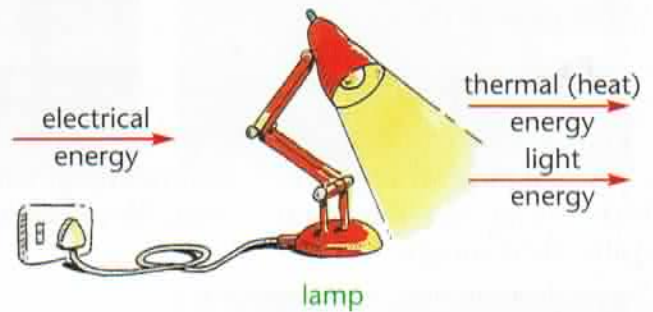


b What other things on this page need electrical energy to work?

Moving energy around

Energy moves from place to place. Look at the drawing of the lamp. The energy comes into the lamp as electrical energy. It comes out of the lamp as light energy and thermal energy. We say that the energy is **transferred**.

We show **energy transfers** using arrows. We write on the arrows to show how the energy is coming in and going out. This is an **energy transfer diagram**.



Energy makes things happen

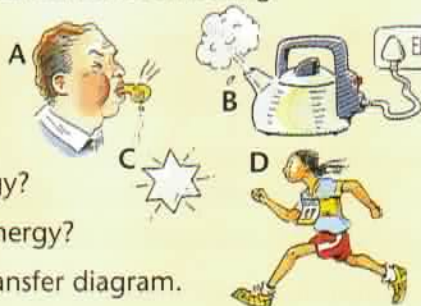
Heat, light and sound energy are all energy. We talk about light energy and sound energy, but there aren't really different types of energy. It is just easier to say 'light energy' rather than 'energy that our bodies detect with our eyes'.

You can think about energy being like money. Money buys things, like energy makes things happen. You can pay with coins or notes, by cheque or by credit card, but it is all money!

Questions

1 Look at pictures A to D. Which picture shows something:

- a** with lots of kinetic energy?
- b** giving out light energy?
- c** giving out sound energy?
- d** giving out thermal (heat) energy?
- e** working because of electrical energy?



2 Copy and complete this energy transfer diagram.



3 Draw and label your own energy transfer diagram for:

- a** an electric cooker
- b** a TV.

For your notes:

- Energy makes things happen. Things work because of energy.
- We sense **light energy**, **sound energy** and **thermal (heat) energy**.
- Things that move have **kinetic (movement) energy**.
- Electricity carries energy. We call this **electrical energy**.
- When energy is moved about, we say it is **transferred**.

Taking the strain

Look at the picture of the archer. Where was the energy before it was moving the arrow? It was stored in the stretched bow and bowstring. We call energy that is stored in something stretched **strain energy**.

Look at the picture of a toy. It moves because it has been wound up. Winding the toy stores energy in a spring inside the toy.



Fuelled up

Look at the picture of a bonfire. The fire is giving out light energy and thermal (heat) energy. Where was the energy before the bonfire started? The energy was stored in the wood. We call energy stored in materials **chemical energy**.



Wood is a **fuel**. All fuels are stores of chemical energy. They give out energy when they are burned.



Food is also a store of chemical energy. Our bodies release the energy stored in the food.



Another store of chemical energy is **batteries**. Batteries use the stored chemical energy to give out electrical energy.

Lifted up

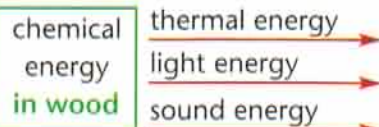
Look at this picture. The bucket and water have kinetic (movement) energy. Where was the energy before the water and the bucket started moving?

The energy was stored in the bucket and the water because they were lifted up. Things that are lifted up have energy because of **gravitational attraction** (gravity). We call energy stored because of gravity, **gravitational energy**.

a Think about a jet plane. What types of stored energy does it have?

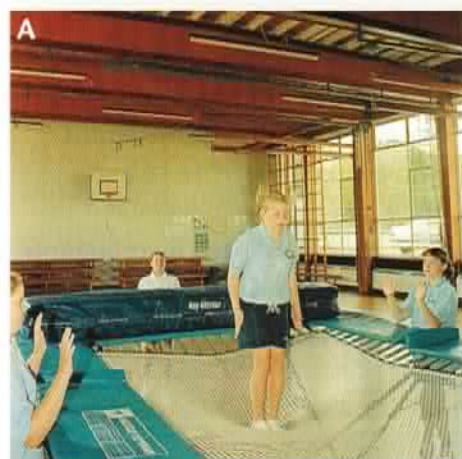
Showing stored energy

We can show stored energy in a box. The diagram shows the stored energy in a bonfire. It is shown in the box. The energy given out when the wood is burned is shown by the arrows.



In and out of storage

Look at the girl on the trampoline. The girl's weight stretches the trampoline. The trampoline pushes the girl into the air.



- b** When is the most energy stored in the trampoline?
How is it stored?
- c** When is the most energy stored in the girl as gravitational energy?
- d** What happens to the energy when it is not being stored as strain energy or gravitational energy?

Energy can be transferred in and out of storage.

Talking more about energy

On page 89, money was used as a model for energy. Money can be transferred using coins, notes, cheques or credit card. We can take the model further.

Money can be stored. It can be stored in a wallet or a purse or a safe. It can be stored in a bank account or a building society. When money is spent, it is like energy being transferred. When money is saved, it is like energy being stored.

Questions

- 1** How is the energy stored in **a** to **f**?

a a stretched rubber band	b a snowball at the top of a hill
c a chocolate bar	d a skydiver jumping out of a plane
e a firework	f a squashed ball.
- 2** Draw and label an energy transfer diagram for the bow and arrow shown in the picture at the top of the opposite page.
- 3** Draw and label an energy transfer diagram for the girl and trampoline. Make sure you include all the stages shown in photos A to C.
- 4** Describe the money model for energy. Do you think it is a useful way of thinking about energy?

For your notes:

- Energy stored because a material is being pulled or pushed is called **strain energy**.
- Energy stored in fuels, food or batteries is called **chemical energy**.
- Energy stored in an object because it is lifted up is called **gravitational energy**.
- Fuels, food and batteries are all stores of **chemical energy**.